

# ON NEARCTIC *DISSOMPHALUS* (HYMENOPTERA, BETHYLIDAE), WITH THE DESCRIPTION OF TWO NEW SPECIES FROM FLORIDA<sup>1</sup>

Celso Oliveira Azevedo<sup>2</sup>

## ABSTRACT

*Dissomphalus evansi* sp. n. and *D. kronbeini* sp. n. from Florida, USA, are described and illustrated. New records of *D. apertus* Kieffer, 1914, *D. arizonicus* Evans, 1962, *D. barberi* Evans, 1954, *D. californicus* Ashmead, 1893, *D. kansanus* Evans, 1954, *D. xanthopus* Ashmead, 1893, are added. Female of *D. arizonicus* is described for the first time.

KEYWORDS. Bethylidae, *Dissomphalus*, Hymenoptera, Nearctic, Systematic.

## INTRODUCTION

Since EVANS (1962), no species of *Dissomphalus* Ashmead, 1893, has been described for the Nearctic region. EVANS (1978) summarized the taxonomy of the Bethylidae of America North of Mexico, including eight species of *Dissomphalus*.

Two new species are described from USA. Further specimens of six other Nearctic *Dissomphalus* species were studied and new distribution data and species variation are recorded. The new species were named in honor of Howard Ensign Evans and Karl Von Krombein in recognition of their great contribution to the taxonomy of Bethylidae and in acknowledgment of their help during the first steps of my carrier.

Specimens examined were provided by the following institutions: AMNH, American Museum of Natural History, USA (J. M. Carpenter & E. Quinter); LACM, Los Angeles County Museum of Natural History, USA (R. R. Snelling); MCZH, Museum of Comparative Zoology, USA (S. Cover & P. D. Perkins); PMAE, Provincial Museum of Alberta, Canada (A. T. Finnamore).

1. Supported by PEAPP, Pró-reitoria de Pesquisa e Pós-graduação, UFES.

2. Universidade Federal do Espírito Santo, Departamento de Biologia, Av. Marechal Campos 1468, Maruípe, 29040-090 Vitória, ES, Brazil (cazevedo@npd.ufes.br).

Abbreviations used in the text are as follow: DAO, diameter of anterior ocellus; LFW, length of forewing; LH, length of head at middle; OOL, ocello-ocular line; VOL, vertex-ocular line; WF, width of frons; HE, height of eye; WH, largest width of head; WOT, width of the ocellar triangle, including the ocelli. The nomenclature for the sculpture follows HARRIS (1979). Terminology follows EVANS (1964).

*Dissomphalus evansi* sp. n.

(Figs. 1-5)

Description. Male holotype, length 3.0 mm; LFW 2.2 mm.

Color: head and mesosoma black, pronotum lighter at borders, metasoma dark castaneous; clypeus, antennae, mandible and legs castaneous; palpi light castaneous; wings hyaline, veins light castaneous.

Head (fig. 1): mandible tridentate. Clypeus subtrapezoidal. First four antennal segments in a ratio of 3:1:1:1, segment XI 1.33 x as long as thick, sensillae elliptical. Frons strongly coriarius, shining, punctures shallow, large, separated by 0-1 x their diameters (fig. 2), frontal carina 0.5 x length of clypeus. LH 1.05 x WH; WF 0.6 x WH; WF 1.18 x HE; OOL 1.04 x WOT; DAO 0.36 x WOT; posterior ocelli distant from the vertex crest 1.22 x DAO. Vertex evenly convex, corners rounded, temples parallel; VOL 0.44 x HE.

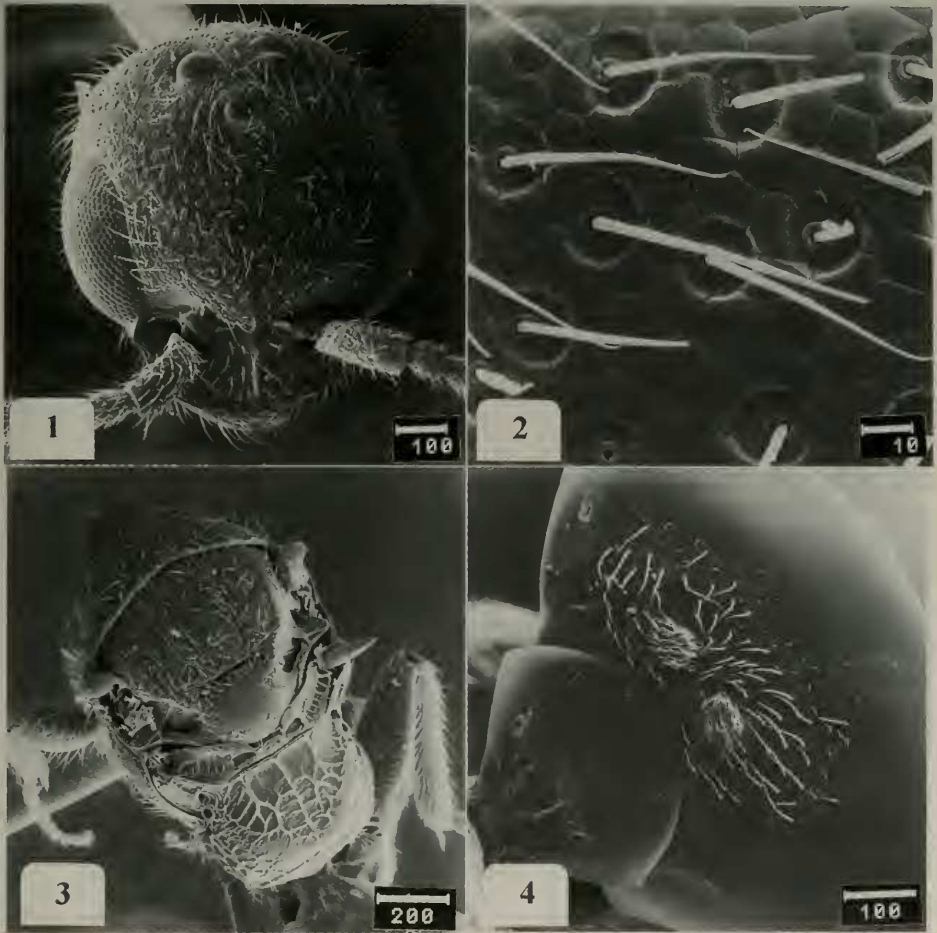
Mesosoma (fig. 3): thorax coriarius as frons and punctures slightly more sparse than on frons. Pronotal disc 0.67 x the length of mesoscutum, with an anterior transverse carina, extending to lateral margins anteriorly. Notaulus straight. Propodeal disc 0.6 x as long and wide, with a complete median carina. Metacarpus as long as stigma. Forefemur 3 x as long as thick.

Metasoma (fig. 4): subpetiolate, elliptical in transverse section. Tergite II with extremely shallow depression, visible only in dorso-posterior view; with a pair of elliptical and inclined tufts densely covered by short hairs, tufts far from each other about 1.0 x their diameters, wholly surrounded by sparse hairs directed inward, hairs between the tufts less numerous; tergite II with an additional pair of light spots. Hypopygium with median stalk 0.87 x the hypopygium, posterior margin nearly straight, corners rounded.

Genitalia (fig. 5): paramere with sharp apex in lateral view; cuspis long; aedeagus with ventral ramus much shorter than dorsal body, margins smooth, narrowing apically, inner margin parallel, outer margin converging, apex thin and rounded, ventral surface concave and slightly laterad; dorsal body with two pairs of apical lobe, the outer with apex sharp and angled downward, the inner very wide, apex rounded, inner surface densely hairy, ventral margin serrated with truncate and membranous teeth; apodema of aedeagus extending beyond the subtriangular genital ring.

Description. Female, length 1.8 mm. Color: body castaneous.

Head: strongly coriarius and densely punctated, punctures large, somewhat deep, separated by about 0.0-0.4 x their diameters, and absent in a small median area of frons. Mandible tetradentate, the lower much larger. Clypeus trapezoidal, median lobe wider than long, median carina high. First four antennal segments in a ratio of 10:5:2:2, segment XI 2 x as long as thick. Eye elliptical, with about 7 facets, distant from the base of mandible 0.83 x its length. LH 1.38 x WH; head with sides parallel and convex. Vertex straight,



Figs. 1-4. *Dissomphalus evansi* sp. n.: 1, head, frontal; 2, head, texture; 3, mesosoma, dorsal; 4, metasoma, dorsal. Scale bars in  $\mu\text{m}$ .

corners rounded, occipital carina weakly visible in dorsal view.

Mesosoma: coriarius, less punctated than head. Mesonotum 0.3 x the length of pronotal disc, posterior margin hardly convex. Propodeal disc 1.41 x as long as wide, maximum width 1.14 x the minimum. Pleurosternum with complete and conspicuous median carina. Metasternum with median carina very high. Forefemur 2.5 x as long as thick. Midtibia without spines.

Metasoma: nearly polished, petiole long and coriarius, with a small posterior carina ventrally.

Material examined. USA. **Florida**: Monroe Co., Big Pine Key, Watson's Hammock, ♂ holotype, 31.VIII-9.IX.1986, FIT, S. Peck col. (PMAE); 20 ♂, 3 ♀, paratypes, same locality as holotype, 25.II-13.XII.1986, Malaise trap or FIT (PMAE); 6 ♀, paratypes Dade Co., Everglades National Park, Long Pine Key, VIII-XII.1986, S. & J. Peck col. (PMAE).

Variation. Legs slightly lighter, tergite II with tufts closer to each other.

Remarks. *Dissomphalus evansi* is similar to *D. apertus* Kieffer, 1914, by having mandible tridentate and ventral margin of inner lobe of dorsal body of aedeagus serrated, but here the ventral ramus of aedeagus has thin apex and the outer lobe of dorsal body of aedeagus is angled downward.

Distribution. USA (Florida).

### *Dissomphalus krombeini* sp. n.

(Fig. 6)

Description. Male holotype, length 1.59 mm; LFW 1.32 mm.

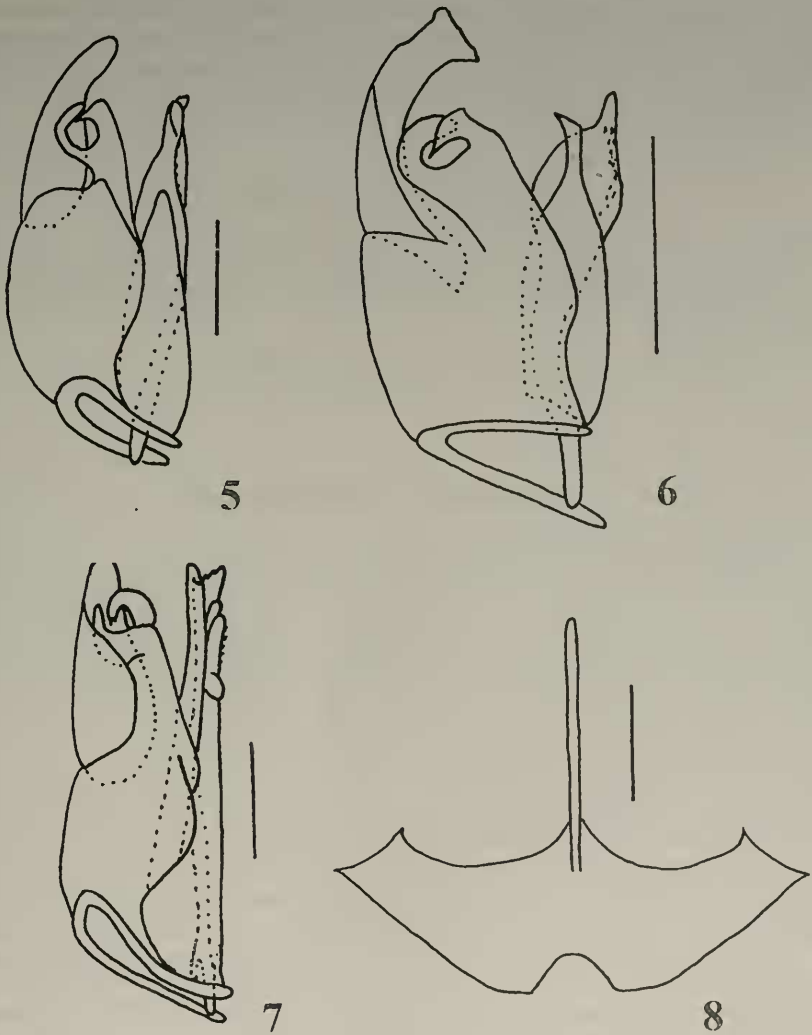
Color: body dark castaneous; antennae, clypeus, mandible and legs slightly lighter; wings hyaline, veins castaneous.

Head: mandible tetradentate. Whole clypeus broadly projected forward, with a small median tooth, median carina slightly high and angled in profile. First four antennal segments in a ratio of 10:5:3:4, segment XI 1.5 x as long as thick. Eye short-haired. Frons weakly coriarius, punctures shallow small, separated by 1-3 x their diameters. LH 1.0 x WH; WF 0.65 x WH; WF 1.37 x HE; OOL 1.17 x WOT; DAO 0.29 x WOT; posterior ocelli distant from the vertex crest 0.86 x DAO. Vertex slightly convex, corners rounded; VOL 0.57 x HE.

Mesosoma: thorax coriarius and punctated as frons. Pronotal disc 0.57 x the length of mesoscutum, with an anterior very weak transverse carina. Notaulus incomplete, present only in the anterior third of mesoscutum. Propodeal disc 0.75 x as long as wide, median carina incomplete, posterior polished area large. Metacarpo 1.2 x the stigma. Forefemur 3.43 x as long as thick.

Metasoma: tergite II with a pair of very shallow subcircular depressions, widely spaced, distant each other 1.6 x their diameters, set near the anterior margin of the tergite, and with a small tubercle, giving rise to a linear tuft of hair, the lateral one being specially longer than the others; each depression occupying the anterior half of the tergite. Hypopygium short, with a stalk 1.91 x the hypopygium, posterior margin concave, corners rounded.

Genitalia (fig. 6): paramere with wide apex, truncate, arched inward, corners somewhat sharp and produced, ventral margin with a rounded lobe below the apex, base of dorsal margin much projected inward and downward; cuspis long and much arched; aedeagus with ventral ramus wide, nearly as long as dorsal body, apex truncate, inclined, outer corner sharpened; inner margin parallel and straight, outer margin convex, ramus thinner below the apex; dorsal body with a pair of apical lobe, outer margin very convex, inner margin straight, surface weakly hairy, apex with a thin and sharpened expansion, base with a long median spine; apodema extending ventrally beyond the genital ring.



Figs. 5-8. 5-7, Genitalia, ventral: 5, *Dissonphalus evansi* sp. n.; 6, *D. krombeini* sp. n.; 7, *D. californicus*; 8, hypopygium, ventral: *D. californicus*. Scale bars = 115  $\mu$ m.

Material examined. USA. **Florida**: Monroe Co., Sugarloaf Key, Kitching, hammock forest,  $\sigma$  holotype, 6.VI-29.VIII.1986, Malaise/FIT, S. & J. Peck col. (PMAE); 9  $\sigma$  paratypes, Monroe Co., 3  $\sigma$ , same data as holotype, except date 6.VI-14.XII.1986 (PMAE); 1  $\sigma$ , Cudjoe Key, Se  $\frac{1}{4}$  S 20; 5.VI-28.VIII.1986, Malaise/FIT, S. & J. Peck col. (PMAE); 5  $\sigma$ , Big Pine Key, Watson's Hammock, 28.VIII-13.IX.1986, FIT, S. Peck col. (PMAE).

Variation. Clypeus with a pair of small rounded expansions; mesosoma lighter; depression of tergite II more distant.



Remarks. *Dissomphalus krombeini* is very similar to *D. politus* Ashmead, 1894 and *D. gilvipes* Evans, 1979, by having the clypeus broadly projected forward and tergal processes with a lateral long hair, but the former species has aedeagus with apex of dorsal body much produced and ventral ramus with apex truncate and inclined.

Distribution. USA (Florida).

### *Dissomphalus apertus* Kieffer, 1914

This is a widespread species through the USA, and it is here recorded to the first time to Virginia, by a female with LH 1.27 x WH; eye distant from the base of mandible 0.83 x its length.

Material examined. USA. Virginia: Pineville, Bayon Ricolette, 1 ♀, 12.III.1942, W. F. Buren collection (LACM).

### *Dissomphalus arizonicus* Evans, 1962

The species was known only from the male type; seven additional males from the type locality were examined, and the *D. arizonicus* is characterized by having the compound eye strongly bulging laterally, ocelli enlarged, and antennal segments slender and long, suggesting nocturnal habits. This series has males with LH 0.89-1.0 x WH; WF 0.53-0.65 x WH; WF 1.29-1.32 x HE; OOL 0.77-0.79 x WOT; DAO 0.36-0.38 x WOT; VOL 0.64-0.65 x HE; propodeal disc 1.14-1.19 x as long as wide.

Description. Female, length 1.5 mm. Color body castaneous.

Head: weakly coriarius, punctures shallow, small, separated by 1-4 x their diameters. Mandible tetradentate, teeth gradually smaller upwards. Clypeus trapezoidal, median lobe much projected forward, median carina high. First four antennal segments in a ratio of 13:5:3:3, segment XI 2.5 x as long as thick. Eye elliptical, with about 4-5 facets, distant from the base of mandible, 1.9 x its length. LH 1.42 x WH, head with sides parallel and slightly convex. Vertex concave, corners rounded, occipital carina visible in dorsal view.

Mesosoma: weakly coriarius, punctures more sparse than those of head. Mesonotum 0.3 x the length of pronotal disc, posterior margin slightly convex. Propodeal disc 1.53 x as long as wide, maximum width 1.01 x the minimum. Metasternum elevated medially. Forefemur 2.25 x as long as thick. Midtibia without spines.

Metasoma: petiole long, gaster nearly polished.

Material examined. USA. Arizona: Cochise Co., Chiricahua Mts, 5,400 feet, Hidden Terrace, 4.5 miles SW Portal, 7 ♂, 1-5.X.1982, M. A. Cazier col. (LACM); Santa Cruz Co., Madera Canyon, 1 ♀, 23.X.1971, D. S. Chandler col. (LACM).

### *Dissomphalus barberi* Evans, 1954

This species was known only from Maine, North Carolina and Maryland (EVANS,

1978) and it is here recorded for the first time to Connecticut and Alabama. EVANS (1978) suspected that the alotype female of *D. barberi* could be identical to *D. xanthopus* by the similarity of the vertex. Indeed, the vertexes of head of both species are heart-shaped and very similar, but in the former species, it seems to be slightly more angled medially. In this series, females have LH 1.52-1.55 x WH; eye distant from the base of mandible 1.83-1.93 x its length; male has LH 1.0 x WH; WF 0.59 x WH; WF 1.23 x HE; OOL 1.44 x WOT; DAO 0.36 x WOT; VOL 0.55 x HE; propodeal disc 1.1 x as long as wide.

Material examined. USA. **Connecticut:** Bethany, 1 ♂, 28.VIII.1968, H. E. Evans col. (MCZH); **Alabama:** Hale Co., Moundville, Mound State Park, 2 ♀, 7.VII.1967, S. Peck & A. Fiske col. (MCZH); Franklin Co., Dismar's Gardens, 1 ♀, 4.VIII.1961, P. Campbell col. (S. Suter & J. Wagner) (MCZH).

### *Dissomphalus californicus* Ashmead, 1893

(Figs. 7-8)

The species was known only from California and it is here recorded for the first time to Arizona. It was the only Nearctic species that did not have its male genitalia described. In this series, females have LH 1.32-1.35 x WH; eye distant from the base of mandible 2.0 x its length; males have LH 0.98-1.0 x WH; WF 0.53-0.57 x WH; WF 1.0-1.14 x HE; OOL 0.82-0.93 x WOT; VOL 0.67-0.68 x HE; propodeal disc 0.73-0.74 x as long as wide.

Male genitalia (fig. 7): paramere wide, with wide apex, straight and inclined with rounded corners; volsella with short cuspis, digitus arched, cuspis-shaped, upper margin without teeth, apex with filamentous edge; aedeagus with ventral ramus elongate, as long as dorsal body, narrowing gradually to a rounded apex, surface slightly laterad, ventral ramus in latero-ventral position to dorsal body; dorsal body with two pairs of apical lobes, the dorsal pair small, directed upward, with sharpened apex, inner surface hairy basally and with rounded teeth apically, the ventral pair long, apical margin wholly serrated, with the inner tooth larger, inner margin of this tooth with small teeth, inner surface of the lobe hairy; aedeagus with two wide expansion between both pairs apical lobe, the dorsal with rounded apex and the ventral with truncate apex; apodema bifurcated below, extending beyond the elliptical genital ring. Hypopygium short, median stalk very long, 2.7 x the hypopygium, posterior margin strongly concave (fig. 8).

Material examined. USA. **Arizona:** Cochise Co., Chirahua Mts, 5,400 feet, Hidden Terrace, 4.5 miles SW Portal, 1 ♂, 11-15.X.1982, M. A. Cazier col. (AMNH); Santa Cruz Co., Yank's Canyon, 1,300m, 31°25'N 111°10'W, 1 ♂, 12-15.VIII.1993, B. V. Brown & D. H. Feener col. (LACM); **California:** Siskiyou Co., 6m, N Castle Lake, 4,000 feet, 1 ♀, 30.VI.1958, J. A. Powell, in *Formica integroides* nest (LACM); Riverside Co., in *Lionetopun* nest in litter, 1 ♀, 10.IV.1977, T.W. Cooper col. (MCZH).

### *Dissomphalus kansanus* Evans, 1954

This species is known from Florida to Kansas, Illinois and Pennsylvania, and has a minute pair of tergal processes, as *D. arizonicus*, and the clypeus with a very high carina, but in this male from Florida this carina is not so high. In this male, LH 1.08 x WH; WF

0.6 x WH; WF 1.36 x HE; OOL 1.3 x WOT; VOL 0.64 x HE; and propodeal disc 0.85 x as long as wide.

Material examined. USA. **Florida**: Monroe Co., Big Pine Key, Watson's Hammock, forest, 1 ♂, 17.IX.1985-25.II.1986, Malaise/FIT, S. & J. Peck col. (PMAE).

### *Dissomphalus xanthopus* Ashmead, 1893

This is a widespread species through the USA and Mexico (EVANS, 1978) and it is here recorded for the first time to Pennsylvania and Indiana. Although the female recognition of *Dissomphalus* is hard, this species can be determined by having the median lobe of clypeus much developed. In this series, male with LH 0.97 x WH; WF 0.71 x WH; WF 1.46 x HE; OOL 1.1 x WOT; VOL 0.73 x HE; propodeal disc 0.95 x as long as wide; females LH 1.37-1.4 x WH; eye distant from the base of mandible 1.75-2.0 x its length.

Material examined. USA. **South Carolina**: 1 miles E Ravenel on US 17, on live-oak, loblolly pine, bark pine base, 1 ♀, 9.VI.1957 (MCZH); **Indiana**: Lawrence Co. Spring Mill St Park, 11 ♀, 7.XI.1971, R.F. Wilkey & J.A.M. Bride col. (LACM); **Pennsylvania**: St. Vinc., 1 ♀ (MCZH); **Tennessee**: Cades Cave, 1 ♀, VI.1979, Johnson col. (MCZH); **Alabama**: Chattahoochee St. Park, Houston Co., log litter, 1 ♀, 2.IV.1969, S. Peck col. (MCZH); **Florida**: Monroe Co., Middle Torch Key, hammock forest edge; 1 ♂, 1-30.III.1986, Malaise trap, S. & J. Peck col. (PMAE); Jackson Co., Cave St. Park, hollow log litter, 1 ♀, 9.IX.1968, S. Peck col. (MCZH); Monroe Co., Big Pine Key, Watson's Hammock, 2 ♀, 31.VIII-9.IX.1986, FIT, S. Peck col. (PMAE).

**Acknowledgments.** To E. R. Bortolini (UFES) for the loan of camera lucida, to curators cited in the text for the loan of specimens, and to PRPPG/UFES for the financial aid.

### REFERENCES

- EVANS, H.E. 1962. Further studies on the genus *Dissomphalus* in the United States, Mexico, and Greater Antilles (Hymenoptera, Bethyilidae). *Proc. ent. Soc. Wash.*, Washington, **64**(2):65-78.
- \_\_\_\_\_. 1964. A synopsis of the American Bethyilidae (Hymenoptera, Aculeata). *Bul. Mus. comp. Zool.*, Cambridge, Mass., **132**(1):1-222.
- \_\_\_\_\_. 1978. The Bethyilidae of America North of Mexico. *Mem. Am. ent. Inst.*, Ann Arbor, **27**:1-332.
- HARRIS, R.A. 1979. A glossary of surface sculpturing. *Occ. Pap. Ent.*, Sacramento, **28**:1-31.